

## ASTR 1000-001: The Solar System – Fall 2013

Tues/Thurs 11:00 am - 12:15 pm, Duane G1B20

<http://learn.colorado.edu>

### Goals:

1. Instill the idea that we are all scientists
2. Instill an appreciation of the many ways in which science influences our everyday lives
3. Convey a sense of excitement associated with scientific discovery
4. Demonstrate that science naturally evolves to explain “how” (**not** “what”)
5. Illustrate that a few scientific concepts explain many diverse phenomena
6. Encourage use of the scientific method to determine ‘best explanations’ for observed phenomena

### Content:

This course is a one-semester introduction to the science of solar system astronomy. We will discuss motions in the night sky and the historical progression that led to their understanding, the current theory for solar system formation, planetary geology, planetary atmospheres, and applications to our current understanding of planets, moons, and small bodies in our solar system.

### Format:

The course will meet twice per week for 75 minutes. Meetings will consist of a mixture of classroom lecture, demonstrations, and active learning (discussion, clicker questions, etc.). I hope to hold class in Fiske Planetarium a few times this semester. In addition to the meetings at the regularly scheduled class time, there will be opportunities to engage with the course material in a guided manner at night, when the planets are visible. 6 nights have been reserved for you at the telescopes of the Sommers-Bausch Observatory (SBO) on campus.

### University Science Requirement:

This course fulfills part B (non-sequence course) of the Natural Science requirement of the Arts & Sciences Core Curriculum. Coupled with ASTR-1020 it fulfills part A (two-semester sequence).

### Required Items:

- Textbook: *The Cosmic Perspective 7<sup>th</sup> Edition*, by Bennett, Donahue, Schneider, and Voit. Published by Addison Wesley. Purchase new, used, or electronically. 6<sup>th</sup> edition is ok.
- An account on MasteringAstronomy.com. Comes bundled with new textbooks, or can be purchased separately. Detailed instructions available on Desire2Learn.  
Course Code: **BRAIN2013FALL**
- An iClicker available at the CU bookstore. New textbooks come with a discount coupon.

### Course Web Site:

All course materials, announcements, and grades will be posted on Desire2Learn at <http://learn.colorado.edu>. **If you need something course-related, go here first!**

**Instructor:** Dave Brain ([david.brain@colorado.edu](mailto:david.brain@colorado.edu); 303-735-5606)

Help Times: Mondays 2:30-4:00pm in Duane D-142  
Wednesdays 5:30-7:00pm in the UMC across from Baby Doe’s  
By appointment

**Teaching Assistant:** Becky Nevin ([rebecca.nevin@colorado.edu](mailto:rebecca.nevin@colorado.edu), 303-492-5010)

Help Times: Wednesdays 4:00 pm - 5:30 pm in Duane E122  
Tuesdays 1:30 pm - 3:00 pm in Duane D122  
By appointment

### Anticipated Course Schedule

Tuesday		Thursday	
Aug 27	Welcome / Scale of the Solar System <b>C1</b>	Aug 29	The Night Sky <b>C2</b>
Sep 03	Motions in the Sky <b>C2</b>	Sep 05	The Wanderers <b>C2</b> <span style="float: right;">HW 1 due</span>
Sep 10	Science of Astronomy <b>C3</b>	Sep 12	Understanding Motion <b>C4</b> <span style="float: right;">HW 2 due</span>
Sep 17	Fiske Planetarium	Sep 19	<b>Exam 1</b>
Sep 24	Gravity and Tides <b>C4</b>	Sep 26	Solar System Overview <b>C7</b> <span style="float: right;">HW 3 due</span>
Oct 01	Solar System Formation <b>C8</b>	Oct 03	Planetary Interiors <b>C9</b> <span style="float: right;">HW 4 due</span>
Oct 08	Planetary Surfaces <b>C9</b>	Oct 10	Understanding Light <b>C5</b> <span style="float: right;">HW 5 due</span>
Oct 15	Special Topic or Fiske Planetarium	Oct 17	<b>Exam 2</b>
Oct 22	Learning from Light <b>C5</b>	Oct 24	Planetary Atmospheres <b>C10</b> <span style="float: right;">HW 6 due</span>
Oct 29	Planetary Climate Evolution <b>C10</b> <span style="float: right;">EC#1</span>	Oct 31	Terrestrial Planet Atmospheres <b>C10</b> <span style="float: right;">HW 7 due</span>
Nov 05	Jovian Planets <b>C11</b>	Nov 07	Jovian Planet Moons <b>C11</b> <span style="float: right;">HW 8 due</span>
Nov 12	Solar System Debris <b>C12</b>	Nov 14	<b>Exam 3</b>
Nov 19	Special Topic or Fiske Planetarium	Nov 21	Exoplanet Detection <b>C13</b> <span style="float: right;">HW 9 due</span>
Nov 26	<b><i>Thanksgiving Break</i></b>	Nov 28	<b><i>Thanksgiving Break</i></b>
Dec 03	Exoplanets <b>C13</b> <span style="float: right;">EC#2</span>	Dec 05	Student's Choice <span style="float: right;">HW 10 due</span>
Dec 10	Life in the Solar System <b>C24</b>	Dec 12	The Last Lecture

**Final Exam: Tuesday December 17, 4:30-7:00 pm in the lecture hall**

- Reading for each lecture is labeled 'C#', and refers to the Chapter number in the textbook.
- SBO observing nights are available on: Sep 05, Sep 19, Oct 07, Oct 24, Nov 04, Nov 19. These are the only dates for our class, regardless of weather or cloud conditions. So don't wait until the end of the semester to go (I advise visiting on one of the first three opportunities)!

**Course Evaluation:**

30%	Final exam	(Dec 17, 4:30-7:00pm)
30%	Mid-term exams	(drop lowest one of three scores)
30%	Weekly homework	(drop lowest one of ten scores)
10%	Clicker questions	(drop lowest 5 of ~25 scores, or replace with lowest mid-term)

I plan to start with an absolute grading scheme (90/80/70/60 for A/B/C/D, with +'s and -'s within these ranges). These numbers may go lower but not higher. This is intended to encourage students to learn together – everyone can earn higher grades.

**Exams:**

Exams will emphasize the application of concepts discussed in the course (not the facts themselves). They will consist of a mixture of true/false, multiple choice, short answer, and more detailed written questions. This mixture minimizes the influence of ‘question type’ on the assessment of your facility with the material. The final exam will be cumulative, with similar format to the midterms. There are no make-up exams even for excused absences; many students will have to miss one exam during the semester, and I accommodate this by dropping one score.

**Homework:**

Homework assignments provide an opportunity to reflect on the concepts discussed in lecture, and verify that each of you understands and can apply them on your own. There will be ten homework assignments due on Thursdays at the start of class. Homework turned in after the first five minutes of class will be accepted with a 20% late penalty. No late homework will be accepted after I leave the lecture hall – no exceptions. Nominally, five assignments will be on-line and five will be written. While you are welcome to work together on written HW, it must be submitted in your own words.

The lowest homework grade will be dropped. In addition, one homework score can be replaced with full credit for attending one of the observing sessions at SBO and completing a short assignment. Two more homework scores can be replaced with two typed 2-3 page essays (due Oct 29 & Dec 05) that require you to reflect on the course material from a non-technical perspective. Topics will be posted at Desire2Learn about one month before they are due. They might not be announced in class.

**Clicker Questions:**

Clicker questions will be asked in most lectures to test your understanding of the concepts *as they are being taught*, and to promote discussion with your peers about the course material. To keep the focus on discussion, and not on right vs. wrong answers, a typical question will be worth three points. Two points will be awarded for any answer, and one more point will be awarded for the correct answer. Your clicker percentage for each day will be calculated, and each day will be weighted equally. Research shows that use of clickers can dramatically improve student understanding, (and therefore student grades). Note that you must attend class regularly to achieve a good clicker score. Your clicker score will be automatically replaced with your lowest midterm exam grade if it benefits you.

**Advice for success in this course:**

- Attend lectures and stay to the end. Take notes. Participate. Try **not** to be passive.
- Read the textbook. Skim the material before class, and try to come prepared with one question.
- Study answers to HW questions, midterms, and clicker questions. You will see them again!
- Seek help if you are having trouble. I like visitors. So does Becky.
- Study with classmates. Work together, but write-up HW on your own and in your own words.
- Stay up-to-date on Desire2Learn. All important information will be reflected there.
- Don't cheat. Please. It may be the only thing that makes me mad.

What follows is University legalese. I will abide by these statements, but it is worth noting that it can all be boiled down to the following statement: **I will treat you with respect and as a unique human being, and hope that you do the same for each other and for me.**

**Honor Code:**

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://honorcode.colorado.edu>

**Learning Environment:**

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name, **and I call on students by name based on this roster.** I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

**Discrimination and Harassment:**

The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://hr.colorado.edu/dh/>

**Disability Accommodations:**

If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services in a timely manner (and at least one week prior to an exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu). If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at Disability Services website (<http://disabilityservices.colorado.edu/>) and discuss your needs with me.

**Religious Observances:**

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, **you must contact me within the first two weeks of the semester to make alternative arrangements.** See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html).

Have a great semester!

A handwritten signature in black ink, appearing to be 'N. A. ...', written in a cursive style.